



Voluntary Carbon Standard Version 2007 Verification Report Template

19 November 2007

Verification Report:

Name of Verification company:	Date of the issue:
Bureau Veritas Certification Holding SAS	09.11.2009
Report Title:	Approved by:
Fuel-Wood Saving with Improved Cook stoves in Cambodia	Flavio Gomes 
Client:	Project Title:
GERES (Groupe Energies Renouvelables et Environnement)	Fuel-Wood Saving with Improved Cook stoves in Cambodia
Summary:	
Bureau Veritas Certification has made the verification of the Fuel-Wood Saving with Improved Cook stoves in Cambodia Project. The verification scope is defined as a periodic independent and objective review and an ex-post determination of the monitored reductions in GHG emissions during defined verification period and consisted of the following three phases: i) desk review of the project design, baseline and monitoring plan; ii) follow-up interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final verification report and opinion. The overall verification, from Contract Review to verification Report & Opinion, was conducted using Bureau Veritas Certification internal procedures. The first output of the verification process is a list of Clarification and Corrective Actions Requests (CL and CAR), presented in the Verification Report. Taking into account this output, the project proponent revised its Monitoring Report Document and other related document. In summary, it is Bureau Veritas Certification's opinion that the project correctly applies the baseline and monitoring methodology :Improved Efficiency in Use of Non-Renewable Biomass Reference: Climate Care Trust, derived from proposed methodology SSC.II.G., amended by the Joanneum Institute and approved by the community of practice (HEDON, Stove and Carbon Special Interest Group) and meets the relevant VCS requirements and local legislation. Based on the information we have seen and evaluated, we confirm the following statement: Reporting period: 10/01/2008 to 31/12/2008 Emission reductions: 192,600 tCO₂e	
Work carried out by:	Number of pages:
Ashok MAMMEN Team Leader Pasuta TONTISIRIN-Team member Nattapat TEERANANTANID-Team member	31

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1. Introduction

GERES (Groupe Energies Renouvelables et Environnement) has commissioned Bureau Veritas Certification to verify the emission reductions of its VCS “Fuel-Wood Saving with Improved Cook stoves in Cambodia Project”/2/.

This report summarizes the findings of the third periodic verification of the project, performed on the basis of VCS – Voluntary Carbon Standard version 2007.1/6/ criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

1.1 Objective

Verification is the periodic independent review and ex post determination of the monitored reductions in GHG emissions during defined verification period. The objective of the periodic verification is to verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan; further more, the periodic verification evaluates the GHG emission reductions data and express a conclusion with a high, but not absolute, level of assurance about whether the reported GHG emission data is free of material misstatements; and verifies that the reported GHG emission reductions data is sufficiently supported by evidences, i.e. monitoring records. The verification shall consider both quantitative and qualitative information on emission reductions. Quantitative data comprises the monitoring reports submitted to the verifier by the project entity. Qualitative data comprises information on internal management controls, calculation procedures and procedures for transfer, frequency of emissions reports, review and internal audit of calculations/data transfers. The verification is based on criteria set by VCS – Voluntary Carbon Standard version 2007.1.

1.2 Scope and Criteria

The verification scope is defined as an independent and objective review of the project design document, the project’s baseline study and monitoring plan and other relevant documents. The information in these documents is reviewed against VCS – Voluntary Carbon Standard version 2007.1/6/ The verification is not meant to provide any consulting towards the Client. However, stated requests for forward actions and/or corrective actions may provide input for improvement of the project monitoring towards reductions in the GHG emissions.

According to the VCS, the verification also includes an independent third party assessment of the project design. In particular, the project baseline, monitoring plan and the project compliance with relevant applicable criteria of the GHG programme recognized by the VCS (e.g UNFCCC CDM baseline and monitoring methodologies) are to be validated in order to confirm that the project design, as documented, is sound and reasonable and meets the applicable criteria. While the verification of the emission reductions reported for the period January 10, 2008 to January 9, 2009 were carried out in accordance with the VCS 2007.1, the validation of the project, in particular the assessment of the baseline and monitoring methodology applied by the project and the evaluation of the project’s eligibility for the VCS, was performed according version 1 of the VCS. The validation was performed in connection to the third verification period.

The project validated under version 1 of VCS can thus be grandfathered into VCS 2007.

1.3 VCS project Description

Title of project activity: *Fuel Wood Saving with Improved Cook-Stoves in Cambodia*

Project Participants: *Project developer: GERES Cambodia*

Project partner: *WENETCAM (Wood Energy Network of Cambodia) and DATe (Development and Appropriate Technology)*

Location of the project activity: *The project is located at 9 regions/states/provinces: Phnom Penh, Kandal, Kompong Speu, Prey Veng, Takeo, Siem Reap, Battambang, Kampong Cham and Kompong Chhnang, Cambodia*

The project was initiated as part of the Cambodian Fuel-wood Saving Project (CFSP), which was created to reduce the wood consumption in Cambodia in order to protect its forest resources. There are two phases of the project.

Phase I of the project began in 1997 and ended in 2001. This phase was primarily a set up phase which elaborated stove design, trained producers and developed a distribution network for the New Lao Stove (NLS).

Phase II of the project started in 2002 and was completed in January 2007. Phase II focused on developing the commercialized distribution of the stove design.

The ultimate goal of the project is to facilitate a nationwide shift from inefficient exploitation of fuel wood to sustainable and efficient biomass use.

Apart from avoiding GHG emissions by reduced wood and charcoal combustion, the project also contributes to improvements in a number of areas: Avoidance of overexploitation of the forests reduction of airborne particles emission and associated respiratory diseases; time saving in firewood collection, reduction of purchased fuel costs, and transfer of technology to indigenous people and creation of employment opportunities.

1.4 Level of assurance

The level of assurance of the verification report is defined as high.

2. Methodology

Findings established during the verification may be that:

- i) The verification is not able to obtain sufficient evidence for the reported emission reductions or part of the reported emission reductions. In this case these emission reductions shall not be verified and certified;
- ii) The verification has identified material misstatements in the reported emission reductions. Emission reductions with material misstatements shall be discounted based on the verifier's *ex-post* determination of the achieved emission reductions.

A corrective action requests (CAR) may be issued, where:

- i) Non-conformities with the monitoring plan or methodology are found in monitoring and reporting, or if the evidence provided to prove conformity is insufficient;
- ii) Mistakes have been made in applying assumptions, data or calculations of emission reductions which will impair the estimate of emission reductions;
- iii) Issues identified in a FAR during validation to be verified during verification have not been resolved by the project participants

A clarification request (CL) may be issued, where:
information is insufficient or not clear enough to determine whether the applicable VCS requirements have been met.

A forward action requests (FAR) may be issued, where:
The monitoring and reporting require attention and/or adjustment for the next verification period.

The overall verification, from Contract Review to Verification Report & Opinion, was conducted using Bureau Veritas Certification internal procedures. The Verification Report shows, in a transparent manner, criteria (requirements), means of verification and the results from validating the identified criteria.

The methodologies used are:

- Voluntary Emission Reductions methodology: “Improved efficiency in use of non-renewable biomass” July 2006, Climate Care Trust./7/

Duration of verification

Preparations:	<i>May 7-8, 2009</i>
On-site verification:	<i>May 11-13, 2009</i>
Verification of subsequent records:	<i>January 10th 2008-December 31st 2008</i>
Draft report:	<i>June 3, 2009</i>
Final Report:	<i>August 20, 2009</i>

2.1 Review of project documentation

The basis for the verification has been the monitoring report from the project for the period January 10, 2009 – December 31, 2009, dated August 7, 2009, version 3/1/ and monitoring records for the same period; version 7 of VCS-PD dated July 7, 2009/2/ and the applied methodology for the project, Voluntary Emissions Reductions: “Improved Efficiency in Use of Non-Renewable Biomass”, July 2006/7/. The project operator has in addition supplied the verification team with instructions from its management system as well as detailed raw data needed for verification of the required emission factors used for the verification period. The main changes between the registered 2nd verification and the 3rd verification are as follows:

- A change in the estimated Stove Shelf Life or the point of sale time (POST) of the NLS from 1 month to 53.4 days. This has been proposed to be monitored *ex-post* as per the 2nd Verification’s Forward Action Request. The FAR is closed.

2.2 Site Visit

Detailed verification of all operational data leading up to the date of the site audit was performed during a visit at GERES Cambodia on May 11-13, 2009. During the site visit, the following personnel were interviewed or assisted the verification team:

Name	Position of GERES Cambodia
Mr. Iwan BASKORO	Country Director
Ms. Charlotte NIVOLLET	Deputy Director

Mr. HOEUNG Chuntheng	QC & Monitoring Unit Manager
Mr Minh Cuong LEQUAN	CCU Manager
Ms. Kimberley BUSS	CDM Analyst
Mr Eric BUYSMAN	CDM Analyst
Mr. SANN Saly	Monitoring Staff
Mr. UNG Malar	Monitoring Staff

These people were also present at the opening and closing meeting of the audit.

2.2.1 Audit Program

The site visit had the following program:

May11, 2009

Time	Activities
10:00 -10:30	Opening meeting & Introductory meeting
10:30-12:30	Data checking of baseline estimation (Phnom Penh office)
13:30-14:00	Data checking of daily monitoring records and spreadsheets (Phnom Penh office)
14:00-15:00	Discussion on the changes on default value due to recent survey
15:30-17:30	Site visit 1 Stove producer (ID: SKV1)
18:00-18.30	Conclusion Meeting Day I

May 12, 2009

Time	Activities
07:00 -09:00	Travel to Kampong Chhnang
09:00-10:00	Site visit 2 Stove producer (ID: KCK)
10:00-11:00	Site visit 3 Stove producer (ID: KTKC)
11:00-12:00	Site visit 4 GERES Office & Training center (DATE)
13:00-14:00	Site visit 5 Stove producer (ID: RRKC)
14:00-16.30	Site visit Stove retailers (3 owners)
17:30-18.00	Conclusion Meeting Day II

May 13, 2009

Time	Activities
08:00 -10:30	Site visit 6 Stove producer (ID: BSPP)
11:00-12:00	Site visit Stove retailer and End users (in Phnom penh)
13:00-15:00	Further Data checking
15:00-16.00	Conclusion Meeting

The site visit program selected 6 main producers from total 19 producers because geography barrier and logistic problems, producer sites scatter across area in Cambodia and difficultly access to all producer sites located in frontier area. In addition, stove technology is not complicated therefore wherever is same technology. However, to ensure that all producers still produce stoves, verification team verifies production and sale records (Logbook) of all producers and checked unit of stoves sold by producers who do not comply with quality control procedures which are excluded from total stove sold in calculation spreadsheet (see detail in monitoring report version 3,KBS-09Aug07_revised_Monitoringreport v.3 page 14)

2.2.3 Review of monitoring results and verification of the correct application of monitoring methodologies

Parameter	Monitoring
Quantity of Stoves sold (Unit)	This data is collected by the monitoring staff and in turn keyed into the spreadsheet for calculation.
Traditional Fuel Consumption (Kg)	This data refer from In 2007 a national user survey was conducted to analyze the fuel mix used in traditional stoves
Wood to charcoal ration (Kg/Kg)	This data uses IPCC (2006) default value for wood to charcoal conversion
Fuel Saving (%)	Household Cooking Test results demonstrate fuel savings of using a New Lao Stove by monitor mass of biomass used before and after installation of the efficiency devices
Equipment Ratio	Equipment ratio refers to the number of stoves used per family which collected from the national user survey in 2007
Stove Shelf life (Day)	The period between the production and the usage of the NLS is determined, the Point of Sale Time (POST). This data Using the figures of the QC labels .
Stove lifetime (Month)	Data collected during the national user survey showed that of stoves users who were no longer using their first stoves
NCV biomass (MJ/Kg)	This data uses Net Calorific Value (NCV) stipulated in the IPCC guidelines 2006.
EF Biomass (tCO ₂ /TJ)	This data uses Emissions Factors stipulated in the IPCC guidelines 2006

2.2.4 Determination of the reductions in GHG emissions

Parameter	<i>Reported Value</i>	<i>Verified Value</i>
Quantity of Stoves sold (Unit)	222,481	222,481
Traditional Fuel Consumption (Kg/month)	Wood 37.56 Charcoal 32.12	Wood 37.56 Charcoal 32.12

Wood to charcoal ration (Kg/Kg)	6	6
Fuel Saving (%)	Wood 20.89 Charcoal 21.2	Wood 20.89 Charcoal 21.2
Equipment Ratio	1.6	1.6
Stove Shelf life (Day)	53.4	53.4
Stove lifetime (Year)	2.5	2.5
NCV biomass (MJ/Kg)	15.6	15.6
EF Biomass (tCO ₂ /TJ)	112	112

2.2.5 Review of additional data from other sources if appropriate.

Additional data use

Net calorific value (NCV) of biomass, wood fuel : 15.615.6 MJ/Kg from Intergovernmental Panel Climate Change (IPCC)

Emission factor of Biomass: 112 tCO₂/TJ from Intergovernmental Panel Climate Change (IPCC)

Wood to charcoal ration: 6 kg wood / kg charcoal from Intergovernmental Panel Climate Change (IPCC)

3. Verification Findings

In the following sections, the findings of the verification are stated. The verification findings for each verification subject are presented as follows.

3.1 Remaining issues, including any material discrepancy from previous verification

This is the Third Periodic Verification of the project.

The data presented in the monitoring report and monitoring and operational records for the entire verification period were assessed in detail by review of the detailed project documentation and production records, interviews with personnel of GERES Cambodia, relevant NLS producers, retailers and end users, collection of measurements, observation of established monitoring and reporting practices and assessment of the reliability of monitoring system. This has enabled the verification team to assess the accuracy and completeness of reported monitoring results and verify the correct application of the monitoring methodology. Following the site visit and submission of additional information, monitoring and operational records for the entire verification period were assessed for the period January 10, 2007 – January 9, 2008. Reconsolidation of all reported data was performed, based on a final assessment of monitoring and operational records from the period subsequent to the audit.

The previous verification raised Forward Action Requests and closing details as below

-Data on the sales of NLS from retailers to end users were only available up to the last quarter of 2007 (October/September). The Project Proponent shall analyze the available data and conclude if the current 30 days assumption (POST) is still applicable and conservative.

Response from a project proponent: used the QC label contains a unique number which is linked to the date of which the producer obtained the label, the POST time can be determined by visiting retailers and recording the point of sale, In the case of the New Lao stove project a sample size of 535 was collected from a total population of 224102 in the 5 provinces. According to the Yamane formula this will give confidence level of 95,7% for the results contained within the sample size. The average POST is 53.4 days with a standard deviation (SD) of 40.7 days. Therefore this verification use new POST is 53.4 days.

-The project has maintained the 3 years default value of NLS's lifespan. However, it is felt that the NLS may still have the 3 years lifespan but the stoves are not used up to the end of lifespan as indicated by the recent national survey on stove usage. It is recommended that the 2.5 years (disposable rate) to be used in the VERs calculation as it is a more conservative value which reflect the current stove usage "behaviors".

Response from a project proponent: Project proponent used stove lifespan 2.5 year in the VERs calculation (NLS database May 10th03-Dec 31st 2008.v6)

-The current system of field data collection by field technician on every alternate day should be reviewed and improved. A more sustainable data collection system should be established. Routine check and approval of data collection should be implemented. Spreadsheets that have been checked and approved should be protected to prevent unintentional editing.

Response from a project proponent: Spreadsheets that have been checked and approved to be protected to prevent unintentional editing by setting password which access by authorized staff

3.1.1 Factors used for project emission reduction calculations

All reported factors required by monitoring methodology of "Improved Efficiency in Use of Non-Renewable Biomass", July 2006,/7/ the parameters required for monitoring given in the VCS-PD as well as necessary management system issues were also assessed during the site visit. This included the following:

Ex-ante parameters:

- a. Fuel saving test (laboratory and actual testing);
- b. Wood to charcoal conversion;
- c. NCV of biomass;
- d. EFCO₂, biomass;

Ex-post parameters:

- a. Sales of New Lao Stoves to distributors;
- b. Stoves produced by respective producers;
- c. Stove lifespan
- d. Equipment ratio per family.

3.1.2 Monitored date for project emissions within the project boundary

The following data reported in the monitoring report from the project has been assessed in detail. When nothing else is stated, the numbers reported are found to be correctly reported.

3.1.2 .1. Quantity of New Loa Stoves sold

This amount is reported on a routine basis when complete NLS is produced. The specification of NLS defined in the version 7 of VCS-PD dated July 7, 2009/2/ is 7 types of NLS (A00, A0, A1, A2, A3, A4 and A5) (CL 1 is closed). The total quantity of each stove type (7 types) produced is summed-up on a monthly basis. This data is collected by the monitoring staff and in turn keyed into the spreadsheet for calculation. Stoves sold by producers who do not comply with quality control procedures are excluded from emissions reductions calculations (in this period of verification 8 Producers are excluded). There was a typing formula error in the Universal Post equation which affects to quantity of New Loa Stoves sold was found during the detail data checking. However, spreadsheet /3/ was revised and quantity of New Loa Stoves sold was corrected by project owner.(CL 9 is closed)

3.1.2 .2. Quantity of New Loa Stove replaced (NLS lifespan)

As part of the National User Survey (2007), the project has selected a 2.5 years as replacement of a NLS based on the disposal rate. It is conservative that the calculation of VERs is based on the latest survey of 2.5 years same as the previous verification. It is conservative that the calculation of VERs is based on the latest survey of 2.5 years.

3.1.2.3 Quantity of stoves in use:

In the previous crediting period, the difference between quantity of stoves sold and stoves replaced is the quantity of stoves in use. The quantity of stoves sold is the total number of NLS sold by all the producers to distributors. An additional field survey has been conducted after the initial verification site visit; a statistically robust Point of Sale Time (POST) analysis has been used to estimate that the time taken from the distributor to reach the end-user is 25.2 days. Additional of 5 days has been included for the transportation from makers to retailers; a total of 30 days has been adopted by the project proponent in the first verification. To ensure the conservativeness of the calculations in the second verification a project owner used the figures of the QC labels and analyses the available data and conclude that Point of Sale Time (POST) is 53.4 days. In the interest of maintaining a conservative estimate a period of 53.4 days is adopted for the third verification period.

3.1.2.4 Quality of New Loa Stoves sold

From Quality control manual and Monitoring Report: Fuel Wood Saving with Improved Cook stoves in Cambodia, version 3: 10 January 2008 – 10 December 2008 dated August 7, 2009 /1/ there are some issues needed to be clarified and response from project owner as below

-Tolerance of stove specification (+ and -) is not clearly defined for QC acceptable criteria. Therefore the project owner revised stove score sheet to clarify for QC acceptable criteria (CL 2 is closed)

-In the quality control manual does not define the type of NLS and TLS sampled to do the testing. However, a project owner revised QC manual to clarify with the type of stoves (CL 3 is closed)

-There are no details of the internationally recognized methodology followed by Household cooking test Data (2008) so a project owner sent document "Kitchen performance test.pdf" and "C4 KPT data calculation sheet.xls" to clarify this issue.(CL 4 is closed)

-In emission reduction calculation sheet, all types of stoves are used to calculate for Voluntary Carbon Units. No details to prove all types of stoves are same efficiency or same fuel saving. Therefore a project owner did stove re-testing and the testing stoves A00, A2, A3, A4 and A5 to prove that their efficiency is comparable to that of A1. (CL 7 is closed)

-Should ensure the NLS-A1 and the TLS-B3 are the good representatives to test and calculate fuel consumption. A Project owner explained that the combustion chamber of TLS B3 is more similar in size to NLS A1, compared to the other TLS sizes. For more detailed in "KBS_09Jul04_Rationale for comparing NLS A1 with TLS B3.v1" (CL 8 is closed).

-In addition, Monitoring staff found Producer Yem Koeum's problems (Dimension of lower pot rim and Dimension of base of combustion chamber did not pass standard) continue 2 months (Jan and Feb 2009). However , they don't have any evidences to find root causes, collective, preventive action and follow up these problems. Corrective action system should be established such as in case dimension monitoring results are defect in many times or recurred, further problem analysis and action plan should be defined and follow up for the effectiveness. (FAR) Finally, the FAR is closed by issue quality control procedure (YIB_2009Jul07_Quality Control Procedure_v0) to set corrective and preventive system of stove quality.

3.2 Project Implementation

The project is implemented and has been in operation since May 10, 2003, when the commercial manufacturing, distribution and sales of NLS commenced. The project started the management and monitoring of quantity produced by the producers and the quantity of NLS sold to the distributors as input to a Voluntary Carbon Standard project since May 10, 2003. All project activities have been implemented as per the VCS-PD version 06 date 25 April 2007. However, NLS size is not updated after validation and the first verification. In VCS-PD version 6 stated that NLS has only 1 size (25.4 cm height, 30 cm diameter) but in validation and first verification report date 26 March 2007 topic 3.1.2.1 Quality of NLS sold stated that NLS has 7 types. During site visit on 11-13 May 2009 verification team found 7 types of NLS also. Therefore the new revised VCS-PD is just only updated there is no effect to VCS calculation.

3.3 Completeness of Monitoring

The monitoring of the project is comprehensive and in accordance with the approved monitoring methodology. The monitoring methodologies and sustaining records were satisfactory in general which enabled the verification of emission reductions. Majority of the factors used are either adopted from IPCC or project specific data. All the parameters needed for emission reduction calculations were sufficiently monitored except that the Project Proponent needs to review the sustainability of the data collection system.

3.4 Accuracy of Emission Reduction Calculations

The formula used for the emission reduction calculations was found to be accurate. The following assumptions were made/implied in the calculations, and they have been substantiated with evidence from the project proponent to confirm that the assumptions made in the calculations are fair and conservative.

The following parameters (*ex-ante*) have been reviewed and revised to ensure conservativeness of assumptions:

a. Quantity of NLS sold

Emission reductions from this project activity are calculated through monitoring the monthly sales of stoves sold by producers. However, the NLS purchased by distributors are not necessarily immediately being sold to end users. It can be assumed that once the stoves reach the end users; they are utilized and emission reductions can accrue. However, emissions reductions will not accrue during the time that stoves take to reach the end user. Two points in the supply chain can affect the length of this period. Firstly, during distribution from producers to retailers, sometimes via middlemen. Secondly, the number of stove shelf days (SSD), the length of time stoves are held by the retailer before their eventual sale to the end user. To estimate the total time lapse between the moment of stove production and the point of sale GERES introduced a NLS labeling system. These labels serve as quality control but also contain a unique number. By recording the moment of which the labels are obtained by the producers and by recording the moment the stove is sold to the user, the period between the production and the usage of the NLS is determined, the Point of Sale Time (POST).

During the second verification period the Point of Sales Time (POST), the time between stoves being sold by the producer and utilized by end users, was assumed 30 days. Using the figures of the QC labels the average POST is 53.4 days, a considerable larger value. However, there are good arguments to assume that the obtained POST value is a very conservative estimate. First of all, the obtained POST includes the period between the QC label obtainment by the producers and the actual labeling of the NLS which occurs in batch wise. The batch wise labeling is executed on a 1-2 weekly basis. Secondly, the results showed extreme POST values, reflecting a long time lapse before the stoves are labeled. Finally, the average POST is not discounted for sales closer to the point of production. In the interest of maintaining a conservative estimate a period of 53.4 days is maintained for the third verification period.

b. Fuel saving test (laboratory and actual testing)

The test was carried out both in the laboratory and in the field. The laboratory test involved the “water boiling test” in laboratory utilizing both the traditional and new Laos stoves to verify the efficiency gained in the NLS that defined in The monitoring activity report Jan 10th-31 Dec 2008./4/ However, Water Boiling Test monitoring frequency is different between monitoring plan (refer to monitoring report Jan 10th-31 Dec 2008 that defined “every three months each stove producer submits 3 stoves for quality control testing”) and the actual condition. Since July 2008 till present, there is no Water Boiling Test. (CAR). Finally, The CAR is closed by Stove re-testing which

prove that the stoves are at least as efficient as assumed in emissions reduction calculations.

The underlying assumption in household cooking tests is that the consumers use only two types of stoves (TLS and NLS) and either use charcoal or fire wood only and monitoring staff conducts the household cooking test every three months. The observation during the site visit revealed that mentoring staff did the household cooking test. However, there are more clarifications needed and response from project owner as below

-Household Fuel Consumption Test record should be recorded the type of NLS and TLS used in order to ensure the stoves will be sampled consistently. For this issue, a Project owner explained that Only NLS A1 is used for household cooking tests (CL 5 is closed)

-Household cooking test was conducted in Boeng Tumpon, PNP 11-24, June 2008 but could not identify the type of NLS used. For this topic, a project owner Revised HFCT log sheets. (CL 6 is closed)

c. Wood to charcoal conversion

Wood to charcoal conversion will be maintained by using the IPCC default value of 6 kg of wood per kg of charcoal.

d. NCV biomass and EFCO₂, biomass

The earlier calculation has utilized default values of IPCC 2006, i.e. NCV biomass and EFCO₂, biomass. The values has been maintained and used in its emission reduction calculations and relevant spreadsheets have been reviewed and deemed satisfactory.

Ex-post parameters:

a. Sales of New Lao Stoves to distributors

In the second verification a FAR has been raised to address this issue and further justification is required for the assumption of 30 days delay as a point of sales timing. Therefore, Monitoring Activities for Verification of GERES-Cambodia's New Lao Stove Project. Jan 10th 2008 – Dec 31st 2008/4/ conclusion that the principal aim is to affirm the validity of the assumption that once a New Lao Stove is sold by a producer it will be used with one month. The average POST is 53.4 days, which is longer than assumed previously. In the interest of maintaining a conservative estimate a period of 53.4 days is maintained for the third verification period.

b. Stoves produced by respective producers

The quantity of stoves produced by each producer is monitored to check on the overall movement of NLS in the market.

c. Stove lifespan

According to the national user survey, it is shown that the average disposable rate of the NLS is 29 months. Therefore the project has selected a 2.5 years as replacement of a NLS based on the disposal rate. It is conservative that the calculation of VERs is based on the latest survey of 2.5 years.

d. The assumption of equipment ratio per family in version 7 of VCS-PD was 1.6 which based on the recent survey.

3.5 Quality of Evidence to Determine Emission Reductions

All necessary documentation is collected, referenced and aggregated and is easily accessible in hard-copy or electronic format. No measuring equipment was involved. Key data can also be cross-checked via other sources, such as stoves produced, sales and inventory data. Some assumptions made have to be further justified to ensure conservative estimation or calculation of carbon emission reductions.

3.6 Management and Operational System

The project owner has applied some management system to the fire wood and charcoal saving project. Relevant monitoring and measurement procedures have been documented and relevant employees have been trained to ensure stipulated procedures are adhered to. The quality assurance of data management has been improved with sufficient checking after each entry on a monthly basis and approved data will be password protected to prevent any unintended edition.

4. Verification conclusion

Bureau Veritas Certification has made the third periodic verification of the VCS Fuel-Wood Saving with Improved Cook stoves in Cambodia, GERES (Groupe Energies Renouvelables et Environnement). The verification was performed on the basis of VCS 2007.1 criteria, Monitoring Methodology is Improved Efficiency in Use of Non-Renewable Biomass Reference: Climate Care Trust, derived from proposed methodology SSC.II.G., amended by the Joanneum Institute and approved by the community of practice (HEDON, Stove and Carbon Special Interest Group), host country criteria and also on the criteria given to provide for consistent project operations, monitoring and reporting. The management of GERES (Groupe Energies Renouvelables et Environnement) is responsible for the preparation of the GHG emission reductions data and the reported GHG emission reductions of the project, on the basis set out within the project Monitoring and Verification Plan, indicated in the final VCS-PD version 7, 7 July 2009. The development and maintenance of records and reporting procedures in accordance with that plan, including the calculation and determination of GHG emission reductions from the project is the responsibility of the management of the project.

Appropriate procedures for maintaining the confidentiality and safe custody of the validation or verification documentation and for retaining them for a period sufficient to meet the need of the clients, the responsible parties, the GHG programmes to which they subscribe, and in accordance with legal and professional requirements of record retention have been established.

Bureau Veritas Certification verified the VCS Monitoring Report version 3 dated on 12/01/2009 for the reporting period as indicated below. Bureau Veritas Certification confirms that the project is implemented as planned and described in the VCS-PD. Installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately. The monitoring system is in place and the project is generating GHG emission reductions (VCUs).

However, the revision of the VCS PD (7/7/09) for clarifying of stove size which do not impact negatively to GHG emission reduction or removals after validation without the acknowledgement from VCS was found during the verification. We would like to recommend VCS to review the procedure of the VCS PD revision. In order to close this issue, the Forward Action Request (FAR) is issued to the project participant to officially notify and obtain the

confirmation from VCS on the PD revision prior to the verification of the next crediting period.

Bureau Veritas Certification can confirm that the GHG emission reductions are calculated without material misstatements. Our opinion relates to the project's GHG emissions and resulting GHG emission reductions, reported and related to the valid and registered project baseline and monitoring and its associated documents. Based on the information we have seen and evaluated, we confirm the following statement:

Reporting period: From 10/01/2008 to 31/12/2008.

Verification emission in the above reporting period:

Baseline Emissions:	226,609.00 tCO ₂ e
Project Emissions:	19.75 tCO ₂ e
Leakage:	33, 989.25 tCO ₂ e
Emission Reductions :	192,600 tCO ₂ e (VCUs)

20 August, 2009

Flavio Gomes
Internal Technical Reviewer

Ashok Mammen
Team Leader & Lead verifier

Pasuta Tontisirin
Team member

Nattapat Teeranantani
Team member

REFERENCES

Documents provided by the project participants that relate directly to the project:

- /1/ Monitoring Report: Fuel Wood Saving with Improved Cook stoves in Cambodia, version 3: 10 January 2008 – 10 December 2008 dated August 7, 2009
- /2/ VCS Project Description (VCS-PD): Fuel Wood Saving with Improved Cook stoves in Cambodia, version 7.0 of 7 July 2009.
- /3/ Additional data: Project Spreadsheet (NLS database May 10th 03-December 31st 2008. V6.xls), Producers' production and sales data, transport emissions spreadsheet and monitoring activities report.
- /4/ Monitoring Activities for Verification of GERES-Cambodia's New Lao Stove Project. Jan 10th 2008 – Dec 31st 2008

Background documents related to the design and/or methodologies employed in the design or other reference documents:

- /5/ Voluntary Carbon Standard, version 1, March 2006.
- /6/ Voluntary Carbon Standard, 2007.1, 18 November 2008.
- /7/ Voluntary Emission Reductions methodology: "Improved efficiency in use of non renewable biomass" July 2006, Climate Care Trust.
<http://cdm.unfccc.int/UserManagement/FileStorage/RX9G3AESH7GO0QVR07CI0DV0AJ02VY>
- /8/ Production and Sales Reports Log books (daily), 10 January 2008 -31 December 2008.
- /9/ International Emission Trading Association (IETA) & the World Bank's Prototype Carbon Fund (PCF): *Validation and Verification Manual*. <http://www.vvmanual.info>.
- /10/ Monitoring Report: Fuel Wood Saving with Improved Cook stoves in Cambodia, version 1& 8: 10 January 2007 – 9 January 2008 dated January 8, 2008 and September16, 2008
- /11/ VERIFICATION AND CERTIFICATION REPORT, FUEL WOOD SAVING WITH IMPROVED COOKSTOVES IN CAMBODIA, JAN 10, 2007 – JANUARY 9, 2008, DET NORSKE VERITAS, REPORT NO. 2008-1011, REVISION NO. 01
- /12/ VERIFICATION AND CERTIFICATION REPORT, FUEL WOOD SAVING WITH IMPROVED COOKSTOVES IN CAMBODIA, MAY 10, 2003 – JANUARY 9, 2007, DET NORSKE VERITAS, REPORT NO. 2007-1007, REVISION NO. 00

Appendix

Verification Protocol

Verification Protocol

TABLE 1 VERIFICATION REQUIREMENTS

CHECKLIST QUESTION	COMMENTS	Draft Concl	Final Concl
1 Project implementation in accordance with the registered project design document			
It is assessed if the VCS project activity has been implemented and operated as per the registered PDD¹			
a Are all physical features of the proposed VCS project activity, proposed in the registered PDD, in place?	The specification of NLS defined in the PDD is only 1 type. but there are actually 7 types of NLS (A00, A0, A1, A2, A3, A4 and A5). Please provide the evidence to explain if this difference affects VCU calculation or not, and provide the amendment of monitoring plan. (Response Details in tables 2)	CL 1	OK
b Have the project participants operated the proposed VCS project activity as per the registered PDD?	Same as CL1	-	OK
c Is the proposed VCS project implemented against the description in the PDD?	Same as CL1	-	OK
d Was an on-site visit conducted?	Yes, during 11-13 May, 2009.		OK
e If not, justify the rationale of the decision.	Not applicable	-	-
2 Compliance of the monitoring plan with the monitoring methodology			
It Is assessed if the monitoring plan of the proposed			

CHECKLIST QUESTION	COMMENTS	Draft Concl	Final Concl
VCS project activity is in accordance with the applied methodology			
a Is the validated monitoring plan in accordance with the approved methodology applied by the proposed VCS project activity?	Refer to monitoring report Jan 10 th -31 Dec 2008 and monitoring activities for verification of GERES-Cambodia's New Lao Stove Project. Jan 10 th 2008-Dec 31 st 2008.-> Consistently relevant to the monitoring requirement in the PDD.	OK	OK
b If no, was a request for revision of the monitoring plan was done? (The DOE may request for revision of the monitoring plan covering the monitoring period under verification, for approval by the Board)	Not applicable	-	-
c Are there any monitoring aspects of the project activity that are not specified in the methodology, particularly in the case of small-scale methodologies (e.g. additional monitoring parameters, monitoring frequency and calibration frequency)?	No.	OK	OK
3 Compliance of monitoring with the monitoring plan			
It is assessed if monitoring of reductions in GHG emissions to result from the proposed VCS project activity is implemented in accordance with the monitoring plan contained in the registered PDD or the accepted revised monitoring plan¹.			
a Have the monitoring plan and the applied methodology been properly implemented and followed by the project participants?	Water Boiling Test monitoring frequency is different between monitoring plan (refer to monitoring report Jan 10 th -31 Dec 2008 that defined "every three months each stove producer submits 3 stoves for quality control testing") and the actual condition.-> Since July 2008 til present, there is no Water Boiling Test.	CAR1	OK

CHECKLIST QUESTION	COMMENTS	Draft Concl	Final Concl
	(Response Details in tables 2)		

CHECKLIST QUESTION	COMMENTS	Draft Concl	Final Concl
b Have all parameters stated in the monitoring plan, the applied methodology and relevant VCS Executive Board decisions been sufficiently monitored and updated as applicable, including:			
i Project emission parameters?	Refer to CL1.	-	OK
ii Baseline emission parameters?	Refer to CL1.	-	OK
iii Leakage parameters?	Leakage deduction was 15 %, refer to the proposed methodology.	OK	OK
iv Management and operational system: the responsibilities and authorities for monitoring and reporting are in accordance with the responsibilities and authorities stated in the monitoring plan?	Yes. Refer to section D.5 of the PDD that defined responsibilities and authorities. Currently, trained staffs (monitoring staffs) are in-charge to monitor and do the quality control following monitoring plan. But there was some difference as mentioned in CAR1.	-	OK
c Is the accuracy of equipment used for monitoring in accordance with the relevant guidance provided by the VCS Executive Board and are equipment controlled and calibrated in accordance with the monitoring plan?			
i Are monitoring results consistently recorded as per approved frequency?	Refer to CAR1.	-	OK
ii Have quality assurance and quality control procedures been applied in accordance with the monitoring plan monitoring plan?	Tolerance of stove specification (+ and -) should be clearly defined for QC acceptable criteria. (Response Details in tables 2) In the Stove Testing Procedure does not define the type of NLS and TLS sampled to do the testing. (Response Details in tables 2) Monitoring staff found Producer Yem Koeum's problems (Dimension of lower pot rim and Dimension of base of combustion chamber did not pass standard) continue 2 months (Jan and Feb 2009). However , they don't have any evidences	CL2 CL3 FAR2	OK OK OK

CHECKLIST QUESTION	COMMENTS	Draft Concl	Final Concl
	to find root causes, collective, preventive action and follow up these problems. Corrective action system should be established such as in case dimension monitoring results are defect many times or recurred, further problem analysis and action plan should be defined and follow up for the effectiveness. (Response Details in tables 2) There are no details of the internationally recognized methodology followed by Household Fuel Consumption Test Data (2008). (Response Details in tables 2)	CL4	OK

CHECKLIST QUESTION	COMMENTS	Draft Concl	Final Concl
4 Assessment of data and calculation of greenhouse gas emission reductions			
It is assessed if GHG emission reductions achieved by / resulting from the proposed VCS project activity are calculated applying the selected methodology			
a Is a complete set of data for the specified monitoring period is available? (If no, i.e., only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, the DOE shall opt to either make the most conservative assumption theoretically possible in finalizing the verification report, or raise a request for deviation if appropriate).	Yes, Refer to Monitoring Report: Fuel Wood Saving with Improved Cook stoves in Cambodia, version 1: 10 January– 10 December 2008 dated February 13 , 2008 and Monitoring Activities for Verification of GERES-Cambodia's New Lao Stove Project. Jan 10th 2008 – Dec 31st 2008	OK	OK
b Has information provided in the monitoring report been cross-checked with other sources such as plant log books, inventories, purchase records, laboratory analysis?	Yes, validators did the cross checking with producer record (production quantity for each kind of stove, selling quantity), quality control record (recorded by quality control staff that including stove production control parameter such as diameter, number of holes), Water Boiling Test, Household Cooking Test.	OK	OK
c Have calculations of baseline emissions, proposed VCS project activity emissions and leakage, as appropriate, been carried out in accordance with the formulae and methods described in the monitoring plan and the applied methodology document?	Yes, Refer to monitoring report 10 January- 31 December 2008	OK	OK
d Have any assumptions used in emission calculations been justified?	Household cooking Test was conducted in Boeng Tumpon, PNP 11-24, June 2008 but could not identify the type of NLS used. (Response Details in tables 2) The post of sale time (POST) 56 days or 53.4 days that do not clear because Monitoring Activities for Verification of	CL5 CL9	OK OK

CHECKLIST QUESTION	COMMENTS	Draft Concl	Final Concl
	GERES-Cambodia's New Lao Stove Project. Jan 10th 2008 – Dec 31st 2008/4/ defined Post of Sale time(POST) is 53.4 days but Monitoring Report: Fuel Wood Saving with Improved Cook stoves in version 1: 10 January 2008 – 10 December 2008 dated February 13 , 2008 Cambodia /1/ in table 1. (summary of ex-ante and ex-post data for NLS verification 2003-2007) defined 56 days. However in NLS database May 10th 03-Dec 31st 2008 v3.xls use POST 53.4 days. However, the calculation of time lapse production and stove utilization of A = ((J86356/12)/365/12) in NLS database do not clear .356 is stand for ? (Response Details in tables 2) Household Fuel Consumption Test record should be recorded the type of NLS and TLS used in order to ensure the stoves will be sampled consistently. (Response Details in tables 2)	CL6	OK
e Have appropriate emission factors, IPCC default values and other reference values been correctly applied?	In emission reduction calculation sheet, all types of stoves are used to calculate for Voluntary Carbon Units. No details to prove all types of stoves are same efficiency or same fuel saving. (Response Details in tables 2) Should ensure the NLS-A1 and the TLS-B3 are the good representatives to test and calculate fuel consumption. (Response Detailsintables2)	CL7 CL8	OK OK

TABLE 2 RESOLUTION OF CORRECTIVE ACTION / FORWARD ACTION / CLARIFICATION REQUESTS.

Draft report clarifications and corrective action requests by verification team	Reference to checklist question in Periodic Verification Checklist	Summary of project owner response	Verification team conclusion
CAR1: Water Boiling Test monitoring frequency is different between monitoring plan (refer to monitoring report Jan 10 th -31 Dec 2008 that defined “every three months each stove producer submits 3 stoves for quality control testing”) and the actual condition. Since July 2008 till present, there is no Water Boiling Test.	3.a	Project owner did Stove re-testing to prove that the stoves sold in 2008 were of sufficient quality to maintain efficiency levels used in the emissions reduction calculations.	After consideration of the results of Stove re-testing (summary of WBTs.xls version 1 and Report template 1 sbrev files), The average stove efficiency is better than used in the emissions reduction calculations. Response to CAR-1 is satisfactory and the same is closed.
CL1: The specification of NLS defined in the PDD is only 1 type. but there are actually 7 types of NLS (A00, A0, A1, A2, A3, A4 and A5) in market during site visit.	1.a	Revised VCS-PD version 7.0 of 7 July 2009 to conform to the real situation.	During site visit, found NLS has 7 types which specify in validation and first verification report on 26/03/07. However VCS-PD version 6.0 is not updated, the project proponent revised VCS-PD version 7.0 of 7 July 2009 to conform to the real situation. There are on changes which effecting to projects activities. However, VCS-PD was revised on 7/7/09 for clarifying of stove size which do not impact negatively to GHG

Draft report clarifications and corrective action requests by verification team	Reference to checklist question in Periodic Verification Checklist	Summary of project owner response	Verification team conclusion
			emission reduction or removals after validation therefore the project participant should to officially notify and obtain the confirmation from VCS on the PD revision prior to the verification of the next crediting period. (FAR1)
CL2: Tolerance of stove specification (+ and -) should be clearly defined for QC acceptable criteria.	3.c.ii	Revised stove score sheet to clarify with QC acceptable criteria.	Response to CL-2 is satisfactory and the same is closed
CL3: In the quality control manual does not define the type of NLS and TLS sampled to do the testing.	3.c.ii	Revised QC manual to clarify with The type of stoves	Response to CL-3 is satisfactory and the same is closed
CL4: Please provide the internationally recognized methodology followed by Household cooking test Data (2008).	3.c.ii	Proposed the Kitchen performance test.pdf" and "C4 KPT data calculation sheet.xls"	The kitchen performance test procedures prepared by Rob Bailis with input from Kirk R. Smith and Rufus Edwards Household Energy and Health Programme, Shell Foundation complied with Household cooking test procedure which is used in this project. Response to CL-4 is satisfactory and the same is closed.
CL5: Household cooking test was conducted in Boeng Tumpon, PNP 11-24, June 2008 but	4.d	Only NLS A1 is used for household cooking tests.	Response to CL-5 is satisfactory and the same is closed

Draft report clarifications and corrective action requests by verification team	Reference to checklist question in Periodic Verification Checklist	Summary of project owner response	Verification team conclusion
could not identify the type of NLS used.			
CL6: Household cooking test record should be recorded the type of NLS and TLS used in order to ensure the stoves will be sampled consistently.	4.d	Revised HFCT log sheets	Response to CL-6 is satisfactory and the same is closed
CL7: In emission reduction calculation sheet, all types of stoves are used to calculate for Voluntary Carbon Units. No details to prove all types of stoves are same efficiency or same fuel saving.	4.e	Stove re-testing The testing stoves A00, A2, A3, A4 and A5 to prove that their efficiency is comparable to that of A1.	Response to CL-7 is satisfactory and the same is closed
CL8: Should ensure the NLS-A1 and the TLS-B3 are the good representatives to test and calculate fuel consumption.	4.e	See document entitled "KBS_09Jul04_Rationale for comparing NLS A1 with TLS B3.v1"	Response to CL-8 is satisfactory and the same is closed
CL9: Monitoring Activities for Verification of GERES-Cambodia's New Lao Stove Project. Jan 10th 2008 – Dec 31st 2008/4/ defined Post of Sale time(POST) is 53.4 days but Monitoring Report: Fuel Wood Saving with Improved Cook stoves in version 1: 10 January 2008 – 10 December 2008 dated February 13 , 2008 Cambodia /1/ in table 1. (summary of ex-ante	4.d	It is 53.4 days. There was a typing error in the emissions reduction spreadsheet – the correct formula is $A = ((POST - (365/12)) / (365/12))$. The spreadsheet and Monitoring	Response to CL-9 is satisfactory and the same is closed

Draft report clarifications and corrective action requests by verification team	Reference to checklist question in Periodic Verification Checklist	Summary of project owner response	Verification team conclusion
and ex-post data for NLS verification 2003-2007) defined 56 days. However in NLS database May 10 th 03-Dec 31st 2008 v3.xls use POST 53.4 days and calculation of time lapse production and stove utilization of A = ((J86-356/12)/365/12). 356 is stand for ?		Report were revised.	
FAR 1: VCS-PD was revised on 7/7/09 for clarifying of stove size which do not impact negatively to GHG emission reduction or removals after validation therefore the project participant should to officially notify and obtain the confirmation from VCS on the PD revision prior to the verification of the next crediting period.	1 a.	-The original draft of the PDD had assumed 100% were using charcoal. During the first verification, in 2007, this was changed to the present defaults which assume a mix of wood and charcoal. This change of the PDD was approved during the first verification. Unfortunately, due to human error one sentence was missed and not revised accordingly. This is the reason we revised the PDD (when the error was spotted by BV)but the revision itself was approved by DNV in 2007. In any case the revision adopts vastly more conservative figures. -A further issue would be that	FAR1 shall be closed prior to the verification of the next crediting period.

Draft report clarifications and corrective action requests by verification team	Reference to checklist question in Periodic Verification Checklist	Summary of project owner response	Verification team conclusion
		since the VCS registry was only recently opened (end 2008) it would have been very difficult for us to notify the VCS as there was no facility to register the PDD. This we could now do (once the letter has been reviewed) but then to do this we would first have to register the old version of the PDD in order to notify them about the revision and then submit the revised PDD	
FAR 2: Monitoring staff found Producer Yem Koeum's problems (Dimension of lower pot rim and Dimension of base of combustion chamber did not pass standard) continue 2 months (Jan and Feb 2009). However , they don't have any evidences to find root causes, collective, preventive action and follow up these problems. Corrective action system should be established such as in case dimension monitoring results are defect in many times or recurred, further problem analysis and action plan should be defined and follow up for the	3.c.ii	Issued the Quality Control Procedure.(YIB_2009july_Quality Control Procedure_v0).	The Quality Control Procedure(YIB_2009july_Quality Control Procedure_v0) sets the shrinkage factor to control the dimension of final product which recorded by QC team very 90 days. Corrective action processes to be implemented if score below 60 points therefore it comply with this FAR Response to FAR-2 is satisfactory and

Draft report clarifications and corrective action requests by verification team	Reference to checklist question in Periodic Verification Checklist	Summary of project owner response	Verification team conclusion
effectiveness.			the same is closed

Appendix 2- Competence of the Verification Team

Mr. Flavio Gomes – Bureau Veritas Certification Internal Technical Reviewer- is a Chemical and Safety Engineer graduated from «UNICAMP – Universidade Estadual de Campinas», with a MSc title in Civil Engineer (Sanitation). He spent four years at RIPASA Pulp and Paper as Environmental Process Engineer. He is, since 2006 the Global Manager for Climate Change. Previously and since 1997, he was senior consultant for Bureau Veritas Consulting in fields of Environment, Health, Safety, Social Accountability and Sustainability audit and management systems. He also acted as Clean Development Mechanism verifier, and Social/Environmental Report auditor, in the name of Bureau Veritas Certification. Flavio is pursuing this PhD on Energy Management at the Imperial College – London.

Dr. Ashok Mammen - PhD (Oils & Lubricants) – Bureau Veritas Certification Lead verifier and team leader
Over 20 years of experience in chemical and petrochemical field. Dr. Mammen is a lead auditor for environment, safety and quality management systems, lead verifier and tutor for GHG projects. He is presently the Technical Manager for Climate Change and has been involved in the validation and verification processes of more than 70 CDM, JI, VCS and other GHG projects.

Mr.Pasuta Tontisirin - Bachelor and Master degree in Environment Engineering - Bureau Veritas Certification Team member
He has 8 years of environmental engineering. He has received the training and obtained the certificates of EMS ISO14000 lead auditor and CDM lead verifier.

Mr.Nattapat Teeranantanid - Bachelor degree in Environment Engineering (Honor and rank 1st in class) - Bureau Veritas Certification Team member. He has 7 years of environmental consultant and engineering experience such as Wastewater treatment plants design and operating, Hazardous waste treatment design, Air pollution control, Environmental Impact Assessment study, Pollution control management study, Energy saving projects and others. He has received the training and obtained the certificates of EMS ISO14000 lead auditor and CDM lead verifier.